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ART. IV.—*Report on the Progress of the Culture of the China Tea Plant in the Himalayas, from* 1835 *to* 1847. *By* J. FORBES ROYLE, M.D., F.R.S.

[*Presented June* 17; *Read November* 18, 1848.]

AMONG the several experiments now in progress for the improvement of the Resources of India, there is not one which, in its ultimate effects, will probably be of such great importance, as the cultivation of the genuine Tea-plant of China in the valleys and slopes of the Himalayan Mountains. Having some further recommendations to make, respecting a culture which I believe I was the first to recommend to the Indian Government in the present localities, I think it advisable to give an account of the reasons which led to the suggestion, as well as of the results which have been obtained.

It was in the early part of the year 1827 that I first mentioned to the Earl Amherst, then Governor-General of India, the probability of a successful cultivation of tea in the Himalayan Mountains, and included it specifically in a report which was presented to the Indian Government at the latter end of that year, stating that "It does not appear by any means so delicate, or so limited in geographical distribution, as is generally supposed, and although it appears to attain the greatest perfection in the mild climate about Nankin, yet it flourishes in the northern latitudes of Pekin and of Japan." On Lord William Bentinck visiting the Saharunpore Botanic Garden, in 1831, I again mentioned the subject, and included it in the report which was presented to his Lordship, in which I stated my wish "to attempt the cultivation of the tea-plant, of which the geographical distribution is extended, and the natural sites sufficiently varied, to warrant its being easily cultivated." This report was afterwards read before the Asiatic Society of Calcutta, and printed in their Journal early in 1832. In the year 1833, in the introduction to my "Illustrations of Himalayan Botany," p. 5, referring to the slopes of these mountains, I stated—"Here there is considerable prospect of success in the cultivation of the tea-plant, for the different elevations allow of every variety of climate being selected," and the "geographical distribution of the plant is extended, and the natural sites sufficiently varied, to warrant its being beneficially cultivated."

Though unacquainted with the fact, I was in the year 1839 informed by Mr. Greene, that Sir Joseph Banks had many years previously recommended the cultivation of tea in the Himalayan Mountains, and that Dr. Govan had also done so at a later period. Dr. Wallich also, in the year 1832, presented a paper to the Committee of the House of Commons, recommending the cultivation of tea in the districts of Kemaon, Gurhwal, and Sirmore.

Not having had an opportunity of detailing my reasons for the opinions which I had so long entertained, I did so in my "Illustrations of Himalayan Botany," pp. 107 to 127, published in 1834. These reasons were given under the heads of "the varieties or species which afford the different teas of commerce—the extent of their distribution —the climate, soil, and culture which they prefer—as well as the plants with which they are associated, either in a wild or cultivated state" (p. 109). After a detailed examination, I stated that, "It cannot be a difficult task to transfer from one country to another, a plant which grows naturally and is cultivated extensively in one which possesses so many of the plants which are common to the two, and not found elsewhere;" and as the soil also seemed suitable, I hoped to see the slopes of the Himalayas covered, and the edges of their terraced flats—for here more completely than either in Italy or China, "the peaks are shelved and terraced round,"—"surrounded with plantations of the tea-plant" (p. 124). I then stated that there could not "be a doubt of success in introducing the cultivation of tea, with the strongest probability of all its properties remaining unchanged, as every requisite is so similar to what it experiences in its native country. It is not an unimportant consideration, that the cheapness of labour exceeds even that in China;" and, "supposing that the finest flavoured teas could not at first be successfully cultivated, an immense consumption would be found among Asiatic nations for even inferior kinds, which would still be superior to what they now use." For carrying out the suggestions, I concluded with stating that, "with a little scientific attention in the choice of a suitable climate and soil for the growth of the plant, and the application of practical experience, (that is, of Chinese who have been accustomed to the process) in the preparation of the leaf, there can be but little doubt with respect to the successful issue of an experiment, which need not be very expensive, if not commenced on too large a scale."

At the time that the above paper was printing in this country, Lord W. Bentinck, with the sanction of the Court of Directors, had determined upon attempting the cultivation of tea in India. A Tea Committee was appointed, who reported that, "the experiment may be made with great probability of success in the lower hills and valleys of the Himalayan range." To this they say they were led by a "very able and interesting letter of Dr. Falconer on the subject." This letter, or report, is remarkable for coincidence in argument and in opinion with what I was at the same time writing and printing in England; and this without any communication of ideas, for the two essays must have crossed each other at sea.

One of the results of the queries circulated by the Tea Committee was an important communication from Major Jenkins, in which he recommends the district of Assam, with its valleys and mountains,—as camellias are found there, and a coarse kind of tea "undoubtedly is indigenous." Of this, some specimens had, it was found, been sent by Lieut. Charlton, three years previously to Calcutta; but leaves and seeds had also been sent as early as 1826 by Mr. D. Scott, who insisted upon their being those of a real tea. In consequence of this discovery, a scientific deputation, consisting of Dr. Wallich, with Messrs. Griffith and M'Clelland was sent to investigate the natural history of Assam. From all of these gentlemen we have received valuable information on different points.

Dr. Wallich conceived that this tea-plant of Assam may have "originally travelled from the frontiers of China;" and concluded that though the forests of Assam might yield a good and potable tea, yet he supposed it would be necessary to ascend much higher to meet with a decided winter of six weeks or two months duration, for the more valued and superior teas, as it is in such localities we must establish our new plantations.

Mr. M'Clelland considered "the plant of Assam" not as an alien estranged from its own climate, but as an indigenous plant; and states, as the result of his observations, that, "protected in Assam under the shade of dense forests, and a gloomy and excessively humid atmosphere, the tea-plant flourishes in its barren soil along the verge of rivers, lakes, and marshy lands;" and he considers the notion regarding the mountain habits of the Chinese tea-plant to be erroneous.

Mr. Griffith also published a detailed report, in which the tea localities, and the appearance of the tea-plants are described. A comparison is also instituted between the vegetation associated with them in Assam, and that of the tea provinces of China; and he came to the conclusion, that "all the evidence points out the visionary nature of the views of the aptitude of the Himalayas, &c., for the cultivation of the tea-plant."

To judge of the general import of these representations, we may notice the effect they produced on the minds of those unconnected with the original recommendations, or with the correction of the supposed errors. This we can do in the case of a very competent witness, Dr. Wight, the author of "Illustrations of the Botany of the

Peninsula of India," who says, at p. 91—" Mr. Royle, in a very elaborate article on the subject, comes to the conclusion that the tea-plant is virtually a native of a temperate climate; and that the slopes of these mountains afford the most proper climate and soil for the growth and culture of this plant. His views, however, are so well supported, and the contradictory evidence on which they are made to rest, so ingeniously explained away, that much difficulty must have been experienced in detecting his errors, had not actual and careful examination of the circumstances under which the plant is produced in its native country, enabled the deputation of the Tea Committee, who went to examine them, to point out the very erroneous nature of the opinions advocated by Dr. Abel, which Mr. Royle had adopted and supported, with such a fruitless expenditure of ingenious reasoning."

So Dr. Meyen, late Professor Extraordinary of Botany in the University of Berlin, in his " Outlines of the Geography of Plants," lately translated by the Ray Society, when treating of the " principal cultivated plants on which the prosperity of nations is based," says, with respect to the tea-plant, at p. 387—" Its culture has also been attempted in Bengal, and great success is expected from it; nay, this question has been very recently discussed by Royle, yet, as it seems, with great partiality to India."

In reply, I may briefly state, that I should regret to have had it proved by the event, or by subsequent information, that I had taken too partial a view, because this in the end is as injurious as an unfavourable one, being equally calculated to discourage enterprize and improvement. Dr. Wight makes the mistake of ascribing to the joint report of a Committee, opinions which were entertained by two only of its members, but certainly not by Dr. Wallich, the head of the Commission, as even after inspecting the tea-sites of Assam, he considered higher elevations as desirable for the more valued and superior teas. (Vide Tea Papers, pp. 58 and 67.). With respect to my having adopted Dr. Abel's opinions, I can only state that they are the same which I had formed in 1827, long before I had read Dr. Abel's work; and that they were formed independently, in consequence of finding in the Himalayas many Chinese plants, and among these some allied to the genus *Thea.* The tea-plant is only one of a number of others which I have recommended for cultivation in different parts of India, in consequence of the apparent suitableness of soil and climate, and from inferences deduced from the Geographical distribution of the Flora of the plains and mountains of India. I was happy to find that I coincided in opinion, not only with Dr. Abel, but with others who had drawn legitimate deductions from what seemed to be well ascertained facts. With respect to the criticism of Mr. M'Clelland and the late Mr. Griffith, it may be observed, that they have omitted to prove, that the tea-plant of Assam is identical as a species with that of China. For if not identical, their objections to my observations are invalid, as not applicable to the same plant, but if identical, their finding it in the moist climate of Assam is a sufficient proof that it is one capable of flourishing in a considerable variety of climate, if it exists also in the more open tea districts of China. That the identity was not settled before proceeding to argue on the unsuitableness of the Himalayan climate for the tea-plant of China, we have the proof in Mr. Griffith's Report on the Honorable Company's Botanic Gardens, Calcutta, p. 102.

"In a practical point of view, an authentic herbarium is equally necessary. Thus supposing the Assam tea-plant (and this appears by no means destitute of foundation) should turn out to be a different species from the Chinese plant, or from either the Chinese green or Chinese black teas, supposing them to be specifically distinct, there will be no reason for doubting that this curious and radical error will have arisen from the want of authenticated specimens of the Chinese plant or plants." If the Assam plant, therefore, be a species distinct from that of China, there is no reason why it should not require a different climate; but if it be only a variety, the result of culture or of neglect in an old place of culture, then also we may have, as in other cultivated plants, some varieties more capable than others of bearing greater extremes of temperature, of dryness, and of moisture.

One of the great difficulties in drawing correct conclusions in this question, is one which in a great measure still continues, and that is, the difficulty of determining what is a species, and what a cultivated variety of the genus *Thea*. Dr. Abel, Sir W. Hooker, Mr. G. Loddiges have given it as their opinion that what is called the green tea-plant (*Thea viridis*) is a distinct species from that called *Thea Bohea*. The latter is well known to be a plant common near Canton, though it was uncertain how far it extended north; but the former flourishes in the northern provinces of China. Others, however, consider them to be only two of several cultivated varieties of one species. Having examined the plants in the nurseries in this country, and seen that they differed greatly from each other, and learnt that they had long retained their characteristics; and that the *Thea viridis* was much more hardy than the *Thea Bohea* in this country, I coincided in opinion with the above authorities, and have as yet seen no reason to change my opinion. In the summer I went with Dr. Falconer to the Royal Botanic Garden at Kew, for the express purpose of examining these plants, as well as the tea-plant of Assam. We agreed that all three appeared to be as distinct as most plants are which are considered to belong to different species. It would however be sufficient for practical purposes, to take the plants which the Chinese themselves employ to make the different kinds of tea, and cultivate them in the soil and climate which seem most similar to their own. It would be interesting, nevertheless, to sow the seeds of these three plants in two or three different situations, in Upper Assam and in Kemaon, but all under similar circumstances in each situation, and to watch the change from or retention of the present characters of each in different soils and climates.

Another great difficulty, and which is hardly yet entirely resolved, is, whether the black and green teas of commerce are the produce of two distinct plants, or whether they are dependent entirely upon processes of manufacture. Mr. Pigou long since stated, that Bohea may be cured as Hyson, and Hyson as Bohea. Mr. Reeves informed me that he believed this information applied to "a species of tea grown in the province of Canton," which can be coloured and made up to imitate various qualities of green tea, as large quantities are yearly thus made. But he himself considered that the genuine green and black teas were the produce of different plants, growing at a distance from each other. This opinion I considered the most likely to be the correct one, from the great attention which Mr. Reeves had paid to such subjects when at Canton. We are still without any positive information from the districts where the best black and green teas of commerce are actually prepared; and I have therefore been unable to ascertain what value the Chinese in these districts, place upon different varieties of plant. But we have now sufficient evidence to be assured that both good black and good green teas may be made from the same plant, and the latter without the aid of colouring matter.

Feeling well assured that the above gentlemen were far from right in their inferences, I was content to leave to time, and to the diffusion of more accurate information respecting China, the corroboration of my own opinions, and this more especially as the conduct of the experiment in the Himalayas was to be under the superintendence of Dr. Falconer. Mr. Gordon, moreover, had been sent from Calcutta to join Mr. Gutzlaff in China, for the purpose of acquiring information respecting the cultivation and manufacture of tea in that country, at the same time that they procured seeds or plants of the most genuine kinds. They succeeded in visiting some hills in the Amoy district, where tea was cultivated. From these they obtained some Bohea tea seeds; and though they failed in visiting the tea districts of Fokien, they obtained further supplies of Bohea tea-seeds. I have been unable to ascertain distinctly from what place these seeds were obtained, nor whether the term Bohea refers to the district, or to the plant which was supposed to yield Bohea tea. They were unfortunately recalled while proceeding to the northward, where they might have been more successful, and, at all events, have obtained seeds and plants of a more hardy nature. The tea-seeds arrived in Calcutta in January, 1835, and produced numerous plants, which were dispatched to the districts where it had been determined to establish tea nurseries, that is, to Assam, and to the Kemaon and Gurwahl portions of the Himalayan Mountains. I had recommended several situations, as Bheemtal, Hawulbagh, Deyra Doon, and Pinjore, in valleys elevated from 2,000 to 2,500 feet; Almora, Jurreepanee, Nahn, and Sabathoo, at elevations of from 4,000 to 5,000 feet; and one locality, Mussooree, at 6,500 feet of elevation, in 30° of north latitude. Dr. Falconer, without any communication, selected Chejooree, Rama Serai, and Koth, at elevations of 4,000, 5,000, and 5,300 feet; with two situations, Ruroo and Bechur-bagh, in Sirmore, at 5,100, and 5,400 feet. He subsequently selected the valley called Deyra Doon, elevated 2,500 feet, as a favourable site, especially after irrigation had been facilitated by the establishment of canals. Sites were at the same time selected in Kemaon by the Commissioner, Mr. Traill, and placed under the charge of Mr. Blinkworth, a plant collector of the Calcutta Botanic Garden, until October 4, 1839, when he was placed under the general superintendence of Dr. Falconer. One nursery was established at Bhurtpore, between Bheemtal and the Ghagur range, at an elevation of 4,500 feet; and a second nursery at Luchmaisur, near Almorah, at 5,200 feet of elevation. The general directions given by the Calcutta Tea Committee were, that "a decided winter climate of six weeks or two months duration, with frost as well as snow, is essential to ensure final success with really good sorts of tea."

From the tea-seeds which arrived in Calcutta in January, 1835, numerous seedlings were raised, but comparatively few reached the tea nurseries. Thus of "20,000, which were dispatched a few months after germination, by boat up the Ganges, for the Himalayan tracts, 90 per cent. died in transit to the nurseries." A quantity of seedlings of the same batch was forwarded at the same time to Assam. Of these 12,000 were seen by the Assam deputation in February, 1835. These were removed to a nursery at Cheykwa; but in the following August not 500 of them were alive. Of the seeds which were sent to Dr. Falconer not one vegetated. But tea seeds cannot be long kept in a sound state.

Before proceeding to detail the results obtained by the establishment of these nurseries, I may briefly state, that a favourable opportunity having occurred when treating of the Productive Resources of India, in 1840, I took a review of the whole question in that work, from p. 257 to p. 311. I was so far from being discouraged, that, I stated, "as Dr. Falconer has expressed his confidence in the success of the culture in the northern parts of the Himalayas, several hundred miles from Upper Assam, and that of the author remains undiminished, we may confidently look forward to having tea cultivated all along these mountains. Thus affording profitable employment to the inhabitants, and to them as well as to the dwellers in the plains, the means of obtaining a cheap and refreshing beverage, which they already highly esteem; and by these means give an impulse to the commerce and agriculture both of the plains and of the mountains." In a note (p. 311), I stated :—"The botanical results confirm those deduced from the climate, that the tea-plant may be cultivated as well in the mid-region of the Himalayas, as in Upper Assam. The growth will no doubt be more slow, but the leaves will probably be not less high-flavoured."

Dr. Falconer having been deputed to investigate the natural history of Cashmere and of Tibet, no report was published on the results of the growth of the above plants; but on the 1st December, 1838, he informed me in a letter that "the tea-plant was thriving vigorously in two, and had flowered in three of the above nurseries;" and again on the 18th May, 1839:—"I have now plants growing at Saharunpore, the produce of seeds from the Koth nursery;" and gave it as his opinion, even at this early period, that they would be able to grow tea cheaper than in China. On the 21st April, 1841, he gave the following details respecting the increase of the plants, and stated that 30,000 seeds had been sown in the year 1840.

Tea Plants at Bhurtpore Nursery, (4,500 ascent,) Bheemtal, and the Ghagur Range, with a Northern Exposure :—

Original plants, the produce of seedlings introduced in 1835 . . .	291
Layers of 1838 transplanted in 1839	25
„ 1839 „ 1840	422
„ 1840 „ 1841	453
Seedlings of 1840	153
	1,344

Tea Plants at Lutchmaisir, near Almorah, and on the N. W. side of the Almorah Ridge, at about 5,200 feet :—

Original plants of 1835	250
Layers of 1838 transplanted in 1839	133
„ 1839 „ 1840	440
„ 1840 „ 1841	240
„ 1839-40, not transplanted	705
Seedlings of 1839 . :	1,003
„ 1840	1,069
	3,840

The plants in the Lutchmaisir nursery, Dr. Falconer considered, speaking generally, to be in a better state than those at Bhurtpore, many of the original ones having grown to bushy plants about five feet high, though they had been prevented from branching out much by the number of layers which had been taken from them. The greater success at Lutchmaisir he ascribed partly to its superiority as a site, and partly to Mr. Blinkworth residing in the neighbourhood, which enabled him to give it more personal superintendence. The results he considered upon the whole most encouraging as regarding the prospect of successful culture of the tea-plant in the Himalayas. "The tea-plants grown from China seed have now been several years in the ground exposed unprotected to every change of the season; they have grown freely, in many cases vigorously; and they are now producing seed in such abundance, that in the course of a few years extensive plantations might be clothed with their progeny without the necessity of introducing seed or plants from any other quarter," though he "would not advise the extension of the culture being left to these means; for the seed, although they germinate treely, are generally smaller than their originals, and the produce will be affected by the seed. For some time to come, the plantations ought to be stocked by means of annual importations of the best kind of seed from China." He had before stated that "the brilliancy of the discovery of the indigenous plant in Assam very naturally concentrated the attention of the Tea Committee upon that quarter; and after the recall of Mr. Gordon from China, but feeble efforts were made towards furnishing the Himalayan nurseries with fresh supplies of China seed. They were left in a great measure to work on with the weakened remains of the first dispatch." At the time this report was written, Dr. Falconer was proceeding to examine the tea nurseries which he had established in Gurhwal, but he stated generally that the results were similar to those obtained in Kemaon.

In regard to the quality of the produce, everything required to be done. Dr. Falconer wisely abstained from attempting to manufacture tea from the imperfect accounts that had been published, observing "It is well known that tea manufacture is a peculiar process which requires skill and tact in the firing, twisting, and other manipulations to which the leaves are subjected. Were unpractised hands to attempt it by following written directions, although they might ultimately blunder into expertness, still a failure in the first instance would, in all probability, be the result, and discredit would naturally, though unfairly, fall upon the produce." He therefore concluded with the following recommendation :—"I beg leave, therefore, strongly to recommend to the favourable consideration of Government, that two complete sets of Chinese tea manufacturers be supplied for the nurseries at Kemaon and Gurhwal, especial care being taken in the selection that these workmen be of the best description."

The Chinese plants, or those produced from the Chinese seed, were at this time also well established at Dinjoy, in Upper Assam. Mr. Watkins, late Superintendent of the Government tea nurseries, stated in 1841 that plants had been carefully cultivated from their seed; but in that year he collected from them leaves sufficient to manufacture two pounds of tea. He reported very favourably of the quality of this tea, as contrasted with the produce of the native trees grown in the Government Barrees, or tea plantations.

In consequence of the foregoing application made by Dr. Falconer, the Indian Government determined upon sending him a small manufacturing establishment. The black and green tea manufacturers, however, who were engaged for this purpose by the Commissioner of Assam, subsequently declined, together with their Superintendent, to proceed to Kemaon. Dr. Wallich was fortunately enabled to procure other men in Calcutta, out of a party of Chinese artisans returned from Assam. A set of manufacturing implements were also procured from Assam at a cost of 77 rupees. These were forwarded to Kemaon in charge of Mr. Milner, the gardener who had been sent from this country and was on his way to the Botanic Garden at Saharunpore.

The Chinamen (nine in number) arrived at their destination in April, 1842. They united in maintaining that the tea-plants of the Kemaon plantations were the genuine cultivated Chinese plant, and far superior to that growing wild in Assam; but though six years old, they did not consider them in a fit state to yield proper tea-leaves. They therefore proposed at the close of the rains to cut down the plants to a level with the ground, in order that in the spring of 1843 new shoots should spring forth, as these are alone fit for making into tea.

The Chinamen, however, made some tea in the autumn of 1842. Dr. Falconer was unfortunately taken ill this very season, and obliged to leave Saharunpore in December, 1842. He arrived in England in June, 1843, having been detained in the south of Europe from ill-health, and brought with him to England some of this, the first specimen of Kemaon tea. Having submitted it for examination to the eminent tea-brokers, Messrs. Ewart, Maccaughy, and Delafosse, of Copthall Court, they stated on the 8th of September, 1843:—

"The tea brought by Dr. Falconer as a specimen of the growth of the China plant in the Himalayan mountains, resembles most nearly the description occasionally imported from China under the name of

Oolong. This resemblance is observable in the appearance of the leaf before and after infusion. The colour of the liquor is also similar, being paler, and more of the straw colour than the general description of black tea. It is not so high-flavoured as the fine Oolong tea with which we have compared it, and has been too highly burnt in the preparation, but it is of a delicate, fine flavour, and would command a ready sale here."

Though this was probably the first tea manufactured, it was not the first Kemaon tea reported on; for Dr. Falconer having, from his serious illness, been relieved from his duties by Dr. Jameson, the present Superintendent, the latter wrote me, on the 12th October, that "The tea plantations in the Deyra Doon and Kemaon are thriving admirably;" and on the 20th January he forwarded to me a small canister of probably the same tea, of which he also sent some to Calcutta. The latter was reported on by members of the Chamber of Commerce, who pronounced the tea to be a very good marketable article, and worth in London about 2*s.* 6*d.* per lb. The specimen sent to London was reported on by Messrs. Thompson, of Mincing Lane, and pronounced to be "of the Oolong Souchong kind, fine flavoured and strong. This is equal to the superior black tea generally sent as presents, and better, for the most part, than the China tea imported for mercantile purposes" This report reached Dr. Jameson in September of the same year, and was "most gratifying" to him.

Dr. Jameson having proceeded to visit the Kemaon tea nurseries, reached them in April, 1843, when he found them "looking admirably, and the Chinamen employed in manufacturing black (Pouchong) tea;" which he states "appears to be of a much superior quality." On the 30th August there were forwarded by the overland route sixteen small canisters of the above tea, covered with wax-cloth to protect it from wet. The wax unfortunately gave a little of its flavour to the tea, as the canisters got injured, and did not arrive at the India House before the month of December.

The reports on these teas, which were submitted to Messrs. Thompson and Son, and to Mr. Wm. Andrews Hunt, are extremely favourable. The former, on the 16th December, 1843, observes that the samples are all more or less affected by the wax-cloth in which the canisters were wrapped. Their valuations, as given in the margin*, are grounded on a supposition that the qualities of each sort will be moderate, for as fancy teas can only be used to a limited extent, the value depends materially upon the amount of import.

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* No. 2, small, even-curled, well made, black leaf, fine tea, of the Oolong class, somewhat like that of fine black-leaf Pekoe, from 2*s.* 6*d.* to 3*s.* 6*d.*

No. 4, a largish, even, rich, blackish leaf, Oolong kind, mixed with a fine, pale leaf. The leaf of the usual size of China Oolong, from 2*s.* 6*d.* to 2*s.* 9*d.*

Mr. Andrews Hunt, formerly Inspector of Tea to the East India Company at Canton, considered No. 2 well made, smallish, blackish, wiry Tetsong kind of leaf. No. 13, much as sample No. 2, but not quite so well made. No. 4, as the Chinese Tetsong Tea. No. 9, as the Ouchain of Souchy tea. The smell of these teas he considered like that of China tea, but rather burnt, much of the Tetsong kind. The taste as fragrant, true, fresh Tetsong. The colour of the infusions of 2, 13, and 4, as very good as Tetsong tea; and that of No. 9, light and clean as Sonchy tea. He estimated the sale value per lb., according to the then price of China tea of corresponding quality, viz.:—

		s.	*d.*		*s.*	*d.*	
No. 2	from	2	9	to	3	0	per lb.
13		2	9		..		
4		2	3		2	6	
9		1	2		..		

The expanded leaf Mr. Hunt considered to be identical with the Chinese plant, but of rather a greener hue; and he observes that the flavour and other characteristics of the leaf of the tea-shrub of Kemaon, are identical with the China plant grown in Oan Khy, (Ankoy,) the district which produces, in Chinese estimation, a more highly-prized article than does the Voo Yee Shan, or mountainous parts of the Bohea district. The appearance and flavour of the best (No. 2) of the four samples are unexceptionable; and while the former does great credit to the Chinese manufacturing operators, the latter fully justifies their opinion that the tea-shrub in the Kemaon plantations is the genuine Chinese plant, and far superior to that grown in Assam.

With regard to these reports, considering that they were made on the first results of an old culture and manufacture, introduced into a new situation, they are as satisfactory as could be expected. It is curious that the tea-brokers should have compared these Kemaon teas with the Tetsong, Oolong, and Sonchy teas of China, which I am informed by Mr. Ball are all Ankoy teas, because this is the very district from which Mr. Gordon probably obtained the original tea-

No. 9, a large black and pale mixed leaf, like Padree Souchong, but scarcely so well made as Padree usually is, from 1*s.* 6*d.* to 1*s.* 9*d.* This is a fine tea, but not esteemed in this market on account of the paleness of the leaf.

No. 13, the same class of leaf, but coarser, about Souchong size, Oolong kind, from 2*s.* to 2*s.* 2*d.*

seeds. (Mr. Ball does not agree with Mr. Hunt in considering that the Ankoy teas are more esteemed by the Chinese than those of Voo Yee Shan, the mountainous parts of the Bohea district). If this permanence of character should be dependent on the plants themselves, it would be extremely encouraging for the introduction of seeds from other, but especially the northern parts of China, of which the climate is probably more similar to that of the slopes of the Himalayan mountains. But this common character of Ankoy teas may be due to the manufacturers having been procured from that district.

At this period I was induced, principally at the suggestion of the Earl of Auckland, to give a lecture at the Royal Asiatic Society on the evening of the 24th of April, on the progress and future prospects of tea culture in the Himalayas. On this occasion many of the foregoing facts were detailed, and it was stated that the latest letters from Dr. Jameson continued to give the most favourable accounts of the tea nurseries. Captain Cautley, moreover, having visited those of the Deyra Doon, wrote: "I saw the Government Garden near Kowlagir, in which there were 4,000 plants growing most luxuriantly, the whole in full blossom. I believe that the whole of these, with the exception of a few brought from the hill plantations, are seedlings; and certainly, as far as luxuriance of vegetation goes, I never saw anything so promising in my life. There cannot be a doubt of the tea growing luxuriantly in all this part of the Doon,—I mean from Deyra to the Nulhwala Ghat." At the conclusion of this address I stated that I felt no hesitation in repeating what I had stated in my "Essay on the Productive Resources," in 1840, "that I confidently looked forward, not only to having tea cultivated all along these mountains, but also to its being finer flavoured than that grown in Assam." I also gave it as my opinion that tea-culture might be introduced round the villages, and even along the margins of the terraced cultivation of the Himalayas, and that tea might be manufactured extensively, cheaply, and of excellent quality, though at first probably most profitably in the elevated valleys at the foot of the Himalayan mountains.

Dr. Falconer, who was present on this occasion, also addressed the meeting, and gave his reasons for the opinions which he had so long entertained, and dwelt especially on the suitableness of the Deyra Doon for an extensive and profitable culture; as he felt convinced that good tea could be produced there cheaper than in China. This valley he considered particularly eligible, as there is a sufficiency of cleared land, moderate in rent, with abundance of cheap labour in the vicinity, great facilities for irrigation, easy access to the Ganges and

Jumna rivers, by which the produce might be conveyed for three-fourths of a penny per lb. to Calcutta. He dwelt particularly on these points, because deficiency of land and of cheap labour, as well as the expenses of conveyance to Calcutta, had been the last started objections to the complete success of an experiment, which had in other respects done so well, and baffled the anticipations of those who contemplated failure, from the unsuitableness of the climate for the growth of the plant.

The subsquent history of the progress of the tea-nurseries, and of the culture in Kemaon and Gurhwal, I derive from Dr. Jameson's letters to myself, and from his reports, the principal of which have been published in the journals of the Agricultural and Horticultural Society of India. In all these are especially displayed the energy and judgment with which he has pursued this interesting and important subject. In his report, dated the 28th of February, forwarded by the Secretary of Government, North-West Provinces, on the 27th of March, 1844, to the above Society, he gives a full account of the number and extent of the nurseries in Kemaon, the numbers of plants contained in them, with some notice of the manufactory.

In addition to the nurseries at Bhurtpore and Lutchmaisir, Dr. Jameson, paying due consideration to the geological structure, soil, locality, &c. had established others, as one of thirty-five acres, Kooa-ke-sar, elevated 4,200 feet, and near the Bhurtpore nursery, near Bheemtal; a second, Anoo, in the same valley as the last, and only separated from it by a small stream that drains it in the rains. He added ten acres to the nursery at Russeeah, which is elevated 4,200 feet, and surrounded by mountains on all sides except the south-west, and is in the neighbourhood of the Tal, or Lake of Now-Chounchee. These nurseries are the first met with in the Chekata district, on ascending the hills by the Bhamouree Ghat, distant about ten miles from the plains. Dr. Jameson also added one acre to the Kupeena nursery, elevated about 5,200 feet, and situated on the acclivity of the Almorah ridge, and adjoining the Lutchmaisir nursery. He also established a nursery of twenty acres at Hawulbagh, and subsequently one at Chullar. These are both situated in the valley of Hawulbagh, adjoin each other, and are elevated about 3,900 feet. "The increase of young tea-seedlings, during the last season, has been 112,392, or equal to four times the number reared since the nurseries were established in 1835-36. Of these, however, 12,201 have been already planted out in different nurseries, leaving 97,191 for transplanting. These, giving five feet to each plant, will cover about fifty-six acres of land. The tea-leaves are gathered by the mallees (gardeners) of the establishment, under the direction of the Chinamen. The seasons for doing so, and making tea, are April, June, July, September, and October, which may be styled the spring, rainy, (summer) and autumn crops. Much the largest quantity was collected in the rainy season, seeing that of the 190 lbs. of tea manufactured during the year, 141 lbs were then made." "The number of the tea-bearing plants amounted last year to 4,366." The tea manufactured, he states, will be transmitted in a few days, in compliance with the wishes of Government of the 30th of August last. The delay which has hitherto occurred, has been caused by the want of tea-canisters. Dr. Jameson further states, that he had been unable to commence manufacturing green tea from the want of implements, which, however, he has no doubt could be made at Almorah, as has been done with those for the black tea, as soon as patterns have been obtained. A tea-case maker was also required, whom he recommended should, in the first instance, be obtained from China, to ensure good packing, upon which so much depends. The only manufactory for tea was at that time at Hawulbagh, to which the tea-leaves were conveyed from the different nurseries; but he recommended the establishment of another manufactory at Bheemtal, to prevent the injury of the leaves, caused by their being conveyed a distance before being manufactured. With respect to the future prospects, Dr. Jameson states, that the experiment, as far as it has been tried, has fully realised the most sanguine expectations, and adds, "There are vast tracts, both in the provinces of Kemaon and of Gurhwal, equally well adapted for the growth and culture of the tea-plant as those where it is now thriving."

In China the tea-plant growers are a different class from the tea manufacturers. So in the Himalayas, it is to be hoped that the villagers will be induced to cultivate the tea-plant, as it "is most hardy, and does not require much care in cultivation." Others will learn to manufacture, and offer their services from village to village. There will be no deficiency of labour whenever there is a regular demand, as the hill people are constantly travelling about in search of employment. He further recommends, in order "that the increase of the nurseries may be adequate with the demand, it would be most desirable to introduce, from time to time, tea-seeds from China in quantity." The Government nurseries now yield a vast quantity of seeds. The plants now amount to 150,000, and these will be doubled or trebled annually.

With reference to the cultivation in the neighbouring district. Dr. Jameson observes, "Nor is the state of the tea-plant in Gurhwal less promising. The nursery at Pooree, established last season, contains about 2,500 plants, in a thriving condition. The nursery at Kaolagir, in the Deyra-Doon, contains about 4,500; and here the plant is thriving as well as in any of the other nurseries. If the leaves yielded by the plants in this locality are fitted for making tea of a superior quality, a vast field for enterprise will be opened up." Dr. Jameson was necessarily doubtful of this at first, because the tea grown at low elevations in China is said to be inferior.

In a letter, dated the 1st of July, 1844, Dr. Jameson, after having inspected all the nurseries, wrote me that at Koth, Rama-Serai, and Gadowlee, in the Gurhwal Hills, the tea-plants are thriving admirably, many of them being nearly six feet high. On the 18th of October he informed me, that the China tea-manufacturers deny that green and black tea are made from different plants; the difference is in the manufacture, and that they were only waiting for the arrival of green tea implements, to manufacture green tea from the same plants from which the black tea had been prepared. And, in a subsequent letter (20th March, 1845), he stated that no gypsum or indigo would be allowed, in order to determine whether green tea can be made without colouring ingredients. On the 25th of January he informed me, that many of the tea-plants were seven and eight feet high; that 436 lbs. of tea had been made, and that three acres of land yielded 162 lbs. of tea; that he had then 120 acres under cultivation, and hoped soon to have 300 acres in the same state; also that the Government had sanctioned the removal of two of the China men to the Deyra Doon, to manufacture tea from the plants growing there. On the 20th of March he states, that he had endeavoured to induce the Government to get fresh tea-seeds from different parts of China, as he coincided with me in the opinion, which I had expressed to him by letter, respecting the necessity of getting tea-seeds from the northern districts of China.

On the 31st of July, Dr. Jameson furnished the Government of the north-west provinces, with a detailed report on the state and prospects of the tea nurseries in Kemaon and Gurhwal. This report was directed by the Honourable the Lieutenant Governor to be forwarded to the Agricultural and Horticultural Society of India; and it is published in vol. iv., p. 173, of their Journal. From this report we learn, that to the nurseries in Kemaon, since the last report, seventy-six acres of land had been added; and that 94,100 plants had been planted in them. In September and November upwards of four lacs of seeds had been sown,—of these 167,000 had already germinated, and they were still daily germinating, so that this season there will be sufficient numbers of young plants to cover eighty or ninety acres; the additions contemplated will amount to forty-seven acres. With respect to the production of tea, he states that,—"The tea-plant does not yield leaves until the third year; no doubt some, more forward than others, do; but I think that pulling leaves when the plants are so young, is detrimental to their rapid growth. From the third year it gradually increases its produce until the eighth or tenth, at which time it attains its maximum." * * * "Kutcha, or green leaves, yield one-fourth this quantity of prepared tea."

"The quantity of tea manufactured has steadily increased, amounting last season to 375 lbs., being an increase of 185 lbs. on the former season. The oldest nursery, that of Lutchmaisir, consisting of little more than three acres, in which there were only 2,560 plants capable of yielding leaves, (the remaining 4,760 being too young,) produced 166 lbs. 2 oz. of tea, or 2 maunds 2 lbs. As the plants become older, and all of them in each nursery capable of yielding leaves, the returns will necessarily and very rapidly be greater, Dr. Jameson calculated that eventually an acre of ground will yield a maund, that is forty seers, (or upwards of 82 lbs. of tea). This being sold at a rate of three rupees per seer, (or about 3*s.* per pound,) will yield 120 rupees. The cost of producing the leaves amounts to about nineteen rupees per annum. One gardener, or mallee, at four rupees a month, is capable of managing three acres of land. A single acre, therefore, will cost sixteen rupees + land rent, three rupees = nineteen rupees per annum; and thus a clear profit of 101 rupees to cover the expense of tea-making, &c. will be left." Dr. Jameson further calculates, that as the number of acres in cultivation will this year be 165, they will yield, when in full bearing, 165 maunds of tea. This being sold at three rupees per seer, will realize 21,600 rupees, while the present expenditure in Kemaon is about rupees 10,595 5a. 8p., leaving a balance of rupees 10,004. "This balance, though good, is very far short of the amount that would be realized were the establishment better adjusted. Thus the present tea manufacturing establishment, with a small additional expense in picking, &c., is capable of making at the rate of from twenty to thirty maunds daily, or of manufacturing tea-leaves procured from 6,000 acres of land."

The manufacturing establishment is larger than was necessary at the beginning, but the Chinese refused to proceed to Kemaon in a smaller number, and the nursery department was sufficient to carry out the experimental views of the Government. Dr. Jameson gives the following tabular view of the profit which may eventually be obtained from this culture.

The expenses of cultivating 6,000 acres .	87,000	0	0
„ „ of making the tea	3,975	0	0
„ „ of packing the tea	2,259	0	0
Land-rent, carriage to Calcutta, &c. . . .	36,500	0	0
	129,734	0	0
To value of 6,000 maunds of tea, or 240,000 seers, at 2 rupees per seer . .	480,000	0	0

Or, say that the tea sold at rupees 1·8 per seer	360,000
Expenditure . . .	129,734
Balance . . .	230,266

In a subsequent part of the report we have information respecting the Gurhwal nurseries. These consist, 1st, that of Kaolagir, before mentioned as having been established by Dr. Falconer, in the Deyra Doon, as being a particularly eligible situation, on account of the abundance of cleared land available for the purpose of tea cultivations. We have already seen that the plants introduced there continued to flourish quite as well as at any of the other nurseries. Dr. Jameson reports, that at this time the nursery consisted of six acres, and contained 8,000 plants. The nurseries at Koth, in the Bhuddree valley, elevated about 5,000 feet, contained 729 plants; and the Rama Serai nursery, in the valley of that name, at about the same elevation, 728 plants. Of these, 287 in the former, and 180 in the latter, consist of the plants originally grown in Calcutta from the seed imported from China. In both these valleys snow falls, and in the latter frequently to the depth of two to three feet, lying on the ground for a period of six weeks, and yet the original plants have not only survived but flourished, affording useful information for the extension of the cultivation in other situations. Dr. Jameson, in 1843, had established another nursery in a situation having something of a similar climate, that is, at Gaddowlee, in the neighbourhood of Paoree, elevated about 5,300 feet above the level of the sea. In 1845 this nursery consisted of three acres, and contained 5,000 plants. He also mentions in this report, that in compliance with the orders of Government, three Chinamen were employed in making tea at Deyra, some of which would be transmitted to Government, for the opinions of judges in England and in Calcutta. He likewise states, that a sale of 173 seers had taken place at Almorah on the 12th of July, of which the results were highly satisfactory, the average amount realized per seer being rupees 4 8a. The maximum price for Pouchong was rupees 5 1a. For Bohea the maximum, rupees 4 8a., minimum, rupees 3 2 annas.

Before making any observations on Dr. Jameson's calculation or the satisfactory results which have been obtained, I will proceed with a relation of the progress of this important culture; this I am enabled to do from the letters with which I have been constantly favoured. On the 18th of October he forwarded to me a small canister of the tea which had been prepared in the Deyra Doon, stating that it had not been prepared above six weeks, which ought to be taken into consideration when opinions are formed on its quality, as China tea is seldom drank before it is at least a year old. The Chinamen pronounced it to be identical in quality with that which they had prepared in the more elevated nurseries of Kemaon. Mr. R. Twining was good enough to examine this tea, and informed me on the 23rd of December,—"I have carefully tasted your sample of Himalaya tea, and I really think it a promising specimen. The flavour is not strong, but it is delicate and pleasant,—a little, methought, of the *Orange Pekoe* character. The complexion of the leaf is rather good, and pains seem to have been taken in the manipulation." This account reached Dr. Jameson by the 5th of February, 1846, when he expressed his delight at the gratifying report which had been made on the Deyra Doon tea, as that settled the question of extension, and of profitable culture and manufacture. At this time the Government authorized *kutcha*, or fresh tea-leaves, being bought from the natives in order to encourage them to cultivate the plant in the grounds of their respective villages.

A further supply of this tea, grown and manufactured in the Deyra Doon, having been forwarded to the Court of Directors, was submitted to the inspection of Messrs. Thompson and Sons, Mr. Hunt, and Messrs. Ewart, Maccaughy and Co., in June 1846. Messrs. Thompson state that—"The leaf is well made, curled, of the Ankoi Pekoe class, mixed black and brown, and closely resembles that class of China tea. The flavour is very strong, and would therefore be serviceable for mixing; but is 'coarse burnt' so that all richness of flavour is destroyed." The Messrs. Ewart:—"The sample of tea marked as manufactured in the Deyra Doon, August, 1845, in leaf somewhat resembles the tea imported from China as Ning Yong, with something of the character both of Oolong and Orange Pekoe. In flavour it much resembles the better description of Orange Pekoe, having with the brisk burnt flavour of that description, more than its usual strength." Though they object to a slight peculiarity of smell and flavour, they pronounce it to be "a good, useful description of tea." Mr. Andrews Hunt gives its characteristics under different heads; as of *appearance of tea;* well made, as well as China tea, and similar to the blackish, mixed, curled Tetsong description. *Smell;* as China tea, but deficient in fragrance, arising probably from some defect in the firing. *Colour of the infusion;* bright and good. *Taste;* rich, good, and strong. *Expanded leaf;* as the finer teas from China. *Aroma:* as good China tea.

The Honourable Court remark as follows on these results, in their dispatch of the 22nd September, 1846, which is published in the Journal of the Agricultural Society of India, vol. vii., selections, p. 14:—

"5. These specimens are very creditable to the efforts of the superintendent, Dr. Jameson, and his establishment.

"6. The latest report of Dr. Jameson shows the quantity of land under tea cultivation, in the districts of Kemaon and Gurhwal, including the Deyra, to be 176 acres, and the total number of plants, 322,579. The plant is stated to be thriving in different localities, extending over four degrees of latitude and three of longitude, and that 100,000 acres are available in the Deyra only, for the purpose of tea cultivation.

"8. We feel a deep interest in this subject, and attach great importance to the success of a project from which considerable advantages would arise to the agricultural community of these districts, who would, it is stated, readily undertake the cultivation of the plant, if encouraged to do so."

In connection with the progress of these northern nurseries may also be mentioned that the China tea plant originally introduced by the Government into Assam, has continued to flourish, and that some of the Chinese tea-makers who have settled there, have prepared some excellent Pouchong tea at Jeypoor in Upper Assam. The results obtained in all the situations where the culture and manufacture of black tea had hitherto been attempted, has been as successful as could have been expected, or even wished, and that judging even by the opinions of the best judges in this country. That it is not less highly esteemed in the place of its production may be inferred from the prices obtained when any of it has been put up for sale. A sale of tea took place in July, 1846, at Almorah, with considerable increase in the prices. The average price was rupees 6 14a., and some of it sold as high as rupees 7 7a., that is, something more than seven shillings a pound, without any duty; and it was a further gratifying fact that most of the tea had been purchased by natives. From want of sheet lead Dr. Jameson was unable to send any of this tea to the Court of

Directors. He also informed me that some green tea had been made; that he had never seen any finer; and that he had not allowed any foreign ingredient to be used in colouring it.

By the September mail of this year Dr. Jameson forwarded to me two small canisters of tea, one containing black, the other green tea, as specimens of the progress they were making, and to obtain the opinions of good judges on the quality, especially of the green tea. Having submitted these specimens to Mr. R. Twining, Mr. Hunt, and to Messrs. Ewart, Maccaughy and Delafosse, they were good enough to examine, and pronounce the following opinions on them:—

"My dear Sir, "*Strand, 25th January*, 1847.

"I am not quite sure that I read your note aright, but I rather understand it to say that the two samples which I have tasted are from the same plant.

"I should not have thought so, either from the taste, the dry leaf, or after infusion. The taste of the black has a little of flavour which does not so decidedly belong to that class; but the colour is that of black (Congou) tea. The wet leaf shews it to be much broken.

The green tea seems to be a better sample in leaf, (at present *pale*,) wanting only more colour to be fair gunpowder, but it draws a good green-coloured liquor, which it might in some degree lose if to the leaf itself more colour were to be given. The wet leaf seems much more perfect in the green than in the black sample.

"Believe me, truly yours,
(Signed) "RD. TWINING."

"*East India Warehouses*,
"My dear Sir, "15 *March*, 1847.

"Having tested the samples of black and green tea grown and manufactured by the East India Company, I beg to offer my opinion upon their quality.

"The black tea has in its appearance the China tea characteristics, and is as well made as that of the finer description from the Oan-Khy district, but it has been injured in the curing, having acquired an 'oveny' smell; in flavour it partakes of the peculiarity of the Oan-Khy tea, being soft and agreeable.

"The green tea (gunpowder) is also as equally well manipulated as the China description, but like all the samples which I have seen of green tea manufactured from the black tea shrub, it is deficient in the richness of appearance and silkiness of touch which characterize the true green tea; in flavour too the difference is very marked, that from the black tea shrub is 'coarse and brassy,' while from the green tea it is 'rich and nutty;' from these discrepancies I cannot think that the black is identical with the green tea-shrub, and it would be interesting to have the point decided, by planting in the Company's garden some seeds from plants grown in Gam-Kang.

"I am, &c.,

(Signed) "W. ANDREWS HUNT.'

"To Dr. Royle."

"The sample of tea marked 'Kupeena, 1846,' is much the same as the specimens of tea we have seen of former years growth from the same district, resembling the Ankoi teas, imported from China under the denomination of Ning-Yong, Oolong, and Orange Pekoe.

"The sample marked 'Green Machoo Tea,' is similar to the gunpowder tea imported from China; the leaf is rather paler, well-prepared, being round and even, but if made smaller it would command a higher price; the infusion is of that pale yellow, and the taste of that strong burnt character, which qualities are usually found only in the finest descriptions of Gunpowder tea; but it is not so high flavoured as the China tea. It is however, of a very useful description, and would sell well here.

(Signed) "EWART, MACCAUGHY & Co.,

"*Brokers.*"

Copthall Court,

"20 *April,* 1847."

Mr. Warrington, of Apothecaries' Hall, having by microscopic examination and chemical tests discovered the nature of the colouring, and other matters which the Chinese employ for facing and artificially dyeing some of their green teas, I was anxious to obtain his opinion of the first sample of green tea that had been prepared in the North-western nurseries. The result of Mr. Warrington's previous examinations had been that of the two kinds of green tea known here as *glazed* and *unglazed,* the former he had found, in all cases that he had examined, dressed with Prussian blue and sulphate of lime, or kaolin, and the latter with sulphate of lime only, and these have an olive yellow tint, without any blue. Of the Assam teas which Mr. Warrington had obtained from the India House, he states that, "none of the Assam teas are glazed, but all have a white powder on their surface." His examination of the Kemaon tea gives similar results, there being no Prussian blue or turmeric, but only a little white earthy powder, as appears by his note. Dr. Wallich has stated to me that the finely powdered gypsum is thrown upon the white, incandescent cinders of the fire, beneath the apparatus holding the tea. This apparatus, on the occasion when he saw it, was a plaited bamboo pan. Other accounts describe the powder as mixed with the tea. Dr. Wallich further informs me that the tea-makers from Canton lay the greatest stress on the use of the dye, probably Prussian blue, for giving the peculiar bloom to their superior green teas.

"*Apothecaries' Hall,*
"*25th November*, 1847.

"My dear Sir,

"I have to offer you a thousand apologies for neglecting the examination of the Himalaya tea before this. It was put away by me very carefully at the time I received it, for an early examination, and entirely lost sight of and forgotten until Mr. Ball asked me about it a week or two ago. I immediately set to work, and have now to give you the results. Under the microscope it appears to be covered with a dirty white powder, which is readily washed off, and appears to consist of some primitive rock, perhaps granite, in a disintegrated state; particles of silica are abundant, and a few minute flakes of mica; there is no appreciable quantity of lime, and no sulphate of lime, and it is also quite free from adventitious colour, as Prussian blue, turmeric, &c. Hoping this may prove satisfactory, and throwing myself on your good nature for my long neglect,

"Believe me, &c.,
(Signed) "R. WARRINGTON."

"P.S.—Is it not too highly dried, and rather scorched in parts?"

"To Dr. Royle."

Early in 1847, I had written to Dr. Jameson respecting the information obtained by Mr. Fortune, that he found the *Thea Bohea* converted into both black and green tea in the south of China, but that in all the Northern Provinces the *Thea viridis* only grown, and equally converted into both kinds of tea. This he acknowledged on the 31st July:—"The remarks of Mr. Fortune are both interesting and satisfactory; and quite account for the disputes which have arisen regarding the different species. For any one confining his attention to one district would of course be convinced that there was but one species. On the other hand another individual who had visited both districts, would come to a different conclusion." Hence the discrepancies in the accounts obtained by different individuals from the tea districts. He moreover states, that "the tea-plant in general cultivation here is the *Thea Bohea.* The true *Thea viridis* is not in the plantations, but the variety from Assam;" and further, that, "the tea this year will I think be very superior to anything yet made, as it has been manufactured and packed under advantages which were not procurable until now; that is, there is now a sheet-lead maker attached to the manufactory." He concludes with, "I am now engaged in extending the tea plantations to 1000 acres."

On the 28th of August Dr. Jameson wrote me from Paoree that another sale of tea had taken place on the 9th August at Almorah:—"The amount realized for green tea varied from rupees 10 8a. to rupees 9 4a. (that is, more than 9 and 10 shillings a pound). For black tea the amount realised was rupees 7 8a. the maximum, and rupees 4 0a. the minimum." He continues: "I have just sent in a long report to Government on the state of the plantations, which has been forwarded to Calcutta for publication." "I am employed in extending the Gadowlee nursery, which though established only about four years, contains about a lac of plants in a thriving condition. All the other nurseries are equally progressing. The Government are about to cut the Kutta Phuthur Canal, in the western Deyra Doon." On the 4th October he states; "I have just received orders from Government to form tea-plantations on the whole of the hilly districts of the North-west frontier, from the Sutledge and new country lately acquired west of that river, to the Ravi;" and that he proceeds immediately towards Kangra to inspect and select sites. The Governor-General pronounces the tea to be as fine as any Chinese tea he had ever drank. Dr. Jameson concludes by stating his conviction that tea will shortly become a most important article of production from the North-west Provinces.

I entirely concur in this opinion, as it is indeed only that which I have long entertained, and frequently promulgated. I have been gratified to find that the inferences deduced from scientific data have been fully borne out by the practical results. There is no doubt that if the best kinds of tea-plant are obtained from the northern districts of China, and with them a few manufacturers from the places where the teas most esteemed in commerce are prepared, and which are consequently those most in use by the British public, that any kind or quality of tea may be prepared as good and as cheaply in the Himalayas as in China. For we have an equal command of soil and climate, with cheap and abundant labour, unoccupied land at a low rent, with comparatively small expense of carriage even to Calcutta. But India itself, with other parts of Asia, will consume a large quantity of tea, when it is obtainable at a moderate price, and even if of a quality inferior to what has already been produced in the Himalayan mountains.

POSTSCRIPT.

Subsequent to the writing of this paper, Mr. Ball, late Inspector of Teas to the East India Company in China, published his work, intitled "An Account of the Cultivation and Manufacture of Tea in China." In this he has fully confirmed the statement first made by the Jesuits, and repeated by others, though contradicted by some, that both the green and black teas of commerce can be and are prepared from the same plant, and that the differences depend entirely on the processes of manufacture. Previous to this Mr. Fortune had ascertained by visiting the different parts of the coast of China, that the *Thea Bohea* was converted into both black and green tea in the south of China, but that in all the northern provinces he found only *Thea viridis* grown, and equally converted into both kinds of tea. But it is quite possible that the Chinese may prefer varieties of the same plant, in particular soils and situations, for the preparation of particular varieties of both black and green teas.

Mr. Ball, in his account of the *manufacture of black tea,* states that the leaves after being gathered are first exposed to the air, where they wither and give or "become soft and flaccid." They are kept in this state until they begin to emit a slight degree of fragrance, when they are sifted, and then tossed about with the hands in large trays. The leaves in each sieve are then collected into a heap, and covered with a cloth. "They are then watched with the utmost care, until they 'become spotted and tinged with red,' when they also increase in fragrance and must be instantly roasted, or the tea would be injured." In the first roasting of all black tea, the fire is prepared with dry wood, and kept exceedingly brisk; "any heat may suffice which produces the crackling of the leaves described by Kæmpfer." The roasting must be continued until the leaves give out a fragrant smell, and become quite soft and flaccid, when they are in a fit state to be rolled. The roasting and rolling are, often a third, and sometimes, with large and fleshy leaves, even a fourth time repeated; and it is only when juices can no longer be freely expressed in the process of rolling, that the leaves are considered to be in a fit state to undergo the final desiccation, in sieves placed in the drying tubs, above a charcoal fire in a common chafing-dish. During this process they begin to assume their black appearance. A considerable quantity of moisture is dissipated, and the fire is then covered with the ash of charcoal, or burnt paddy-husk, which both moderates heat and prevents smoke. "The leaves are then twisted, and again undergo the process of drying, twisting, and turning as before; which is repeated once or twice more, until they become quite black, well twisted, and perfectly dry and crisp."

Mr. Ball, after detailing the variations required in the manufacture to produce the different kinds of black tea, proceeds to describe the *mode of preparing the green teas* of commerce. These he classes under the heads of Hyson and Singlo; all other kinds are made from these shrubs, and there is much reason to think that even the Hyson is merely the Singlo shrub improved by soil and cultivation." Of the manipulation he states that there are only two gatherings of the leaves of green tea; the first begins about the 20th of April, and the second at the summer solstice. "The green tea factors universally agree that the sooner the leaves of green tea are roasted after gathering the better, and that all exposure to the air is unnecessary, and to the sun, injurious." The iron vessel in which the green tea is roasted is called a Kuo. It is thin, about sixteen inches in diameter, and set horizontally, (that for Twankay obliquely,) in a stove of brickwork, so as to have a depth of about fifteen inches. The fire is prepared with dry wood, and kept very brisk, the heat becomes intolerable, and the bottom of the kuo oven red hot, though this is not essential. About half a pound of leaves are put in at one time, a crackling noise is produced, much steam is evolved from the leaves, which are quickly stirred about; at the end of every turn they are raised about six inches above the surface of the stove, and shaken on the palm of the hand so as to separate them and to disperse the steam. They are then suddenly collected into a heap, and passed to another man, who stands in readiness with a basket to receive them.

The process of rolling is much the same as that employed in the rolling of black tea, the leaves taking the form of a ball. After the balls are shaken to pieces, the leaves are also rolled between the palms of the hands, so that they may be twisted regularly, and in the same direction. They are then spread out in sieves, and placed on stands in a cool room.

For the second roasting the fire is considerably diminished, and charcoal used instead of wood, and the leaves constantly fanned by a boy, who stands near. When the leaves have lost so much of their aqueous and viscous qualities as to produce no sensible steam, they no longer adhere together, but by the simple action of the fire separate and curl of themselves. When taken from the kuo, they appear of a dark olive colour, almost black. After being sifted they are placed on stands as before.

For the third roasting, which is in fact the final drying, the heat is not greater than what the hand can bear for some seconds without much inconvenience. "The fanning and the mode of roasting were the same as in the final part of the second roasting. It was now curious to observe the change of colour which gradually took place in the leaves, for it was in this roasting that they began to assume that blueish tint, resembling the bloom on fruit, which distinguishes this tea, and renders its appearance so agreeable."

The foregoing being the general mode of manufacturing green or Hyson tea, it is separated into different varieties, as Hyson, Hyson-skin, young Hyson, and Gunpowder, by sifting, winnowing, and fanning, and some varieties by further roasting.

From this it is obvious, as remarked by Mr. Ball, that the peculiar colour of green tea does not properly arise from the admixture of colouring matter with the leaves, but naturally out of the process of manipulation; and by some experiments which Mr. Ball made, it appears that leaves while undergoing the third roasting in the same vessel, but kept separate by a thin partition of wood, became of a black or of a green colour, according as they were kept in a quiescent state or in constant motion. "The leaves kept in constant motion dried rapidly, and soon assumed the colour and appearance of green tea. The other parcel (kept in as quiescent a state as possible) required a much longer drying, and when completed assumed the colour of black tea" (p. 242). Mr. Ball enters fully into the subject of the chemical changes which take place, and on the cause of difference in the properties of black and green teas; for which and for much valuable and correct information his work must be consulted.

Though it has been proved that both black and green teas may be and are prepared from the same plant, it has also been shown from Mr. Fortune's investigation that the *Thea viridis* and its varieties are the chief, if not the only kinds, cultivated in the northern districts of China, where most of the more valuable teas of commerce are produced. As it was desirable to obtain seeds and plants from these very localities, means have been taken to insure this object, as well as to obtain further information on the subject of manufacture.

Since this paper was written, Dr. Jameson's report, alluded to at p. 184, has been published in the *Journal of the Agricultural and Horticultural Society of India*, vol. vi., part II. In this, a detailed account is given of the state of the several nurseries at the time. With regard to soil, Dr. Jameson states "that the tea-plant thrives well both in stiff and free soils, and in many modifications of these;" and with regard to elevation that "it thrives equally well at heights ranging from 2,200 feet above the level of the sea to 6000 feet." The quantity of ground then in cultivation was 162½ acres: also "that the minimum of return of tea for an acre of land may be estimated at one pucka maund, or 80 lbs." We have also the interesting fact stated, that though the Pouchong (black) tea sold at an average rate of Rupees 6, 8a. 8p. per seer, and that at least half the quantity sold was bought by natives, the coarse Bohea tea was reserved and sold to the Bhoteahs at a price varying from rupees 2 to rupees 2, 4a. per seer. "It has been purchased by them in order to carry it across the passes into Thibet. Nor will it be long, if the importation of Kemaon tea into Chinese Tartary is not prohibited, before that market is wholly supplied from the British provinces."

By one of the last mails, I have been favoured with a letter from Dr. Jameson, dated January 25, of the present year, in which he states that 2,656 lbs. of tea had been manufactured last year, and that of this he had just despatched 600 lbs. of black and green tea to this country, and that "it was finer-looking than any sent in former years;" also that "by the end of this season there will be 400 acres under cultivation at Kolaghir in the Doon;" and "at Paoree I expect to have 200 to 300 acres;" and that he has "about 250,000 seedling plants ready to transplant." "Last season I sent a lac (100,000) of the plants to the Kangra valley, where most of them are doing well;" while "the seeds collected from our own plantations this season amount to upwards of 2,000,000 (two millions). From the plantation at Deyra (Kolaghir) we shall be able, in the course of eight or ten years, to raise a sufficient number of plants to plant the whole Doon."

London, April, 1849.